Summary of Fishery Surveys
Deer Lake, Price County, 2008 and 2015-2016

WDNR's Fisheries Management Team from Park Falls completed fyke netting and electrofishing surveys in 2008 and 2015-2016 to assess the status of important fish populations in Deer Lake. Fyke netting in October yielded useful information on black crappies. Fyke nets deployed shortly after the spring thaw targeted muskellunge, northern pike, and yellow perch. Late-spring electrofishing surveys documented the abundance and size structure of largemouth bass and bluegill populations. Quality, preferred, and memorable sizes referenced in this summary are based on standard proportions of world record lengths developed for each species by the American Fisheries Society. "Keeper size" is our own description for bluegill ≥ 7 inches and black crappie ≥ 9 inches long, based on known angler behavior.

Survey Effort

2008

On May 7th, 2008 we set four fyke nets at sites chosen to intercept early-spring spawners and fished them overnight for two nights (8 net-nights) when water temperature ranged 53–57°F. Comparing measured water temperatures to optimal spawning temperatures, this netting survey probably occurred after pike spawning activities had subsided. With water temperature at 63°F our May 29, 2008 electrofishing survey should have coincided with the early spawning activities of largemouth bass and bluegills. We sampled all 2.16 miles of mainland and island shoreline in 0.90 hour, including 1.01 mile sub-sampled for all species in 0.40 hour.

2015-2016

On October 13–15, 2015 at water temperatures 51–53°F, we set four fyke nets to intercept fall movements of black crappies, tending the nets daily for 8 net-nights of fishing effort. We returned on April 12th, 2016 and set four fyke nets at or near the same locations selected to catch mature pike and perch in 2008. Early spring 2016 nets fished three nights (12 net-nights) when water temperature ranged 39–47°F, and this time spring netting corresponded well with the movements of all targeted adult populations. With water temperatures at 66°F our June 2nd, 2016 electrofishing survey should have coincided with the staging and nest-building activities of largemouth bass and bluegills. We sampled the entire lake perimeter (1.95 miles), but not the island, in 0.98 hour, including 0.50 mile sub-sampled for all species in 0.27 hour.

Habitat Characteristics

Deer Lake is a 145-acre drainage lake located about 1½ miles north of Phillips, WI. Deer Lake discharges to Deer Creek, which flows 11.2 miles to the Elk River. The average depth is 6 feet and the maximum depth is 18 feet. Compared to nearby lakes, water clarity is usually higher-than-average with low turbidity and only a light brown stain (Secchi depth = 7.5 feet). Lakebed materials are 40% gravel, 1% rock, and 59%

muck. Mixed hardwoods and conifers cover 30% of the shoreline, and the rest is bog. In our recent electrofishing circuit we noted abundant submerged woody structure along the southeast shoreline and gravel along the east shore. Shoreland residences are sparse, and there is a house on the 2.3-acre, privately-owned island. The Town of Worcester maintains a public boat landing with a gravel ramp and parking area on the south shore.

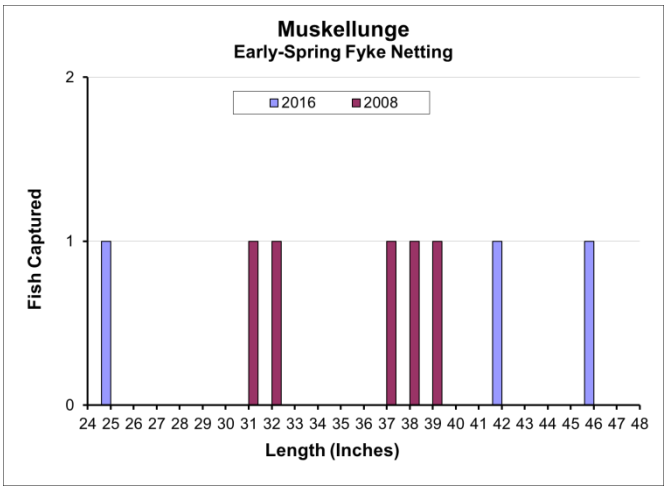
Summary of Results

Netting and electrofishing captured 13 fish species, and species richness was similar in 2008 (n = 12) and 2016 (n = 10). Earlier surveys captured several other minnows and darters that we did not find recently. Largemouth bass was the most common predator, and bluegills and black crappie ranked first and second in panfish abundance.

Muskellunge

Early Spring Fyke Nets

	Number per net-night ≥ 20"	Quality Size ≥ 30"	Preferred Size ≥ 38"	Memorable Size ≥ 42"
2016	0.3	67%	67%	67%
2008	0.6	100%	40%	0%



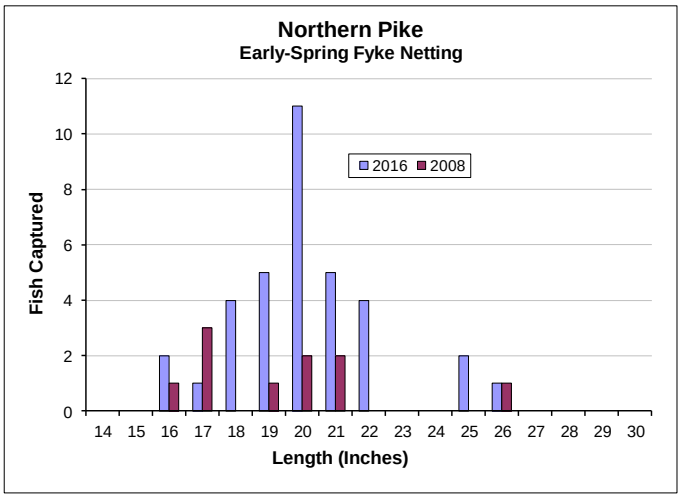
Our capture rates of muskellunge in early spring 2008 and 2016 fyke nets both indicated low adult population abundance. At low density muskellunge can grow well beyond memorable size, even in this relatively small lake. Past surveys have shown that Deer Lake is capable of producing trophy-size muskies over 50 inches long, provided that their abundance remains low and their forage is plentiful. Deer Lake is categorized among Wisconsin's Class B muskellunge waters, which support intermediate musky populations that provide good fishing, but with generally lower catch rates than in Class A waters. Though musky spawning habitat of marginal quality was identified in 1986, stocking is required to maintain the fishery. Deer Lake received muskellunge fingerlings stocked at rates of 1-5 fingerlings per acre nearly every year from 1937 to 1993. After surveys revealed limited recruitment from planted fingerlings, the stocking rate and frequency were reduced. Muskies have been stocked in even-numbered years at one large fingerling/acre since 1996 and at 0.5 fingerling/acre since 2002. Based on observations of a local fishing guide, angling pressure directed toward muskies is believed to be moderate and harvest low, but not zero, under the 40-inch minimum length limit.

Illustrations by Virgil Beck

Northern Pike

Early Spring Fyke Nets

	Number per net-night ≥ 14"	Quality Size ≥ 21"	Preferred Size ≥ 28"
2016	2.9	34%	0%
2008	1.4	30%	0%

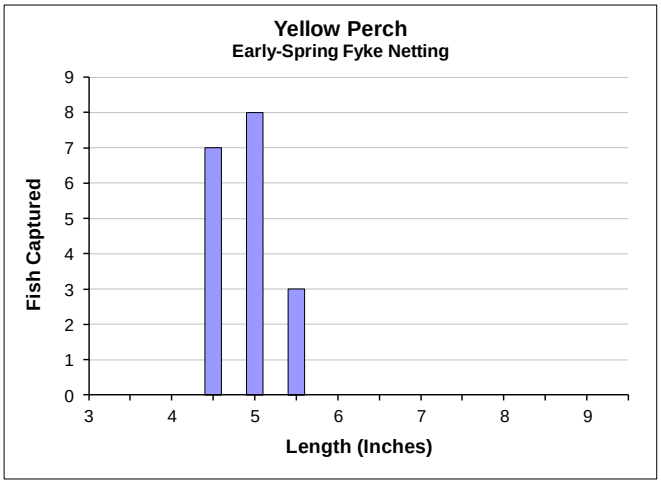


Catch rates of northern pike in early spring fyke nets nearly doubled from 2008 to 2016. This change is most likely due to the favorable timing of our recent survey, rather than an increase in pike abundance. The 2008 survey occurred well after the northern pike spawning period had peaked, while the 2016 survey was well timed to capture spawning pike. The disappointing size structure was nearly identical in both surveys with very few pike longer than 22 inches. Anglers are encouraged to keep up to five northern pike of any size to reduce food competition with largemouth bass and muskellunge because all three predators prefer to eat yellow perch.

Yellow Perch

Early Spring Fyke Nets

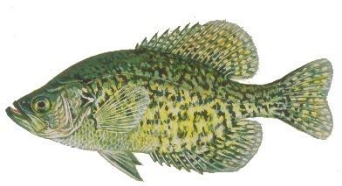
Captured 0.6 per net-night ≥ 5"	
Quality Size ≥ 8"	0%
Preferred Size ≥ 10"	0%
Memorable Size ≥ 12"	0%



Yellow perch persist at very low abundance, yet apparently the population does not produce any quality-size fish. Evidence of perch status was consistent throughout Deer Lake's survey history. Of 275 perch measured in five comprehensive assessments from 1970 to 2016, the longest was 7.3 inches and 94% were less than 6 inches. Catch rates were 2.8, 0, and 1.5 perch of all sizes per net-night in spring 1970, 2008, and 2016 netting surveys. Usually fish populations in low abundance can produce larger fish that anglers like to catch and keep. Perhaps species- and size-selective predation by muskellunge and northern pike, both known to eat the largest perch to obtain an efficient ration of their favorite food, can explain the absence of quality-size perch. Although 4.5- to 5.5-inch perch offer no angling opportunity, perch are important as the preferred food of all predators in Deer Lake.

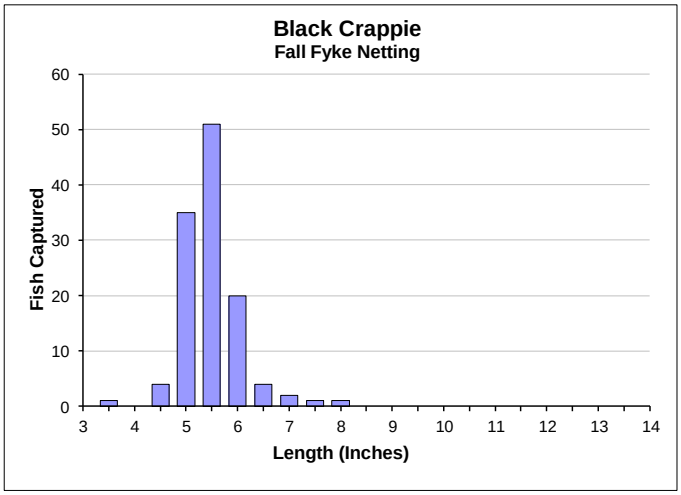
Illustrations by Virgil Beck

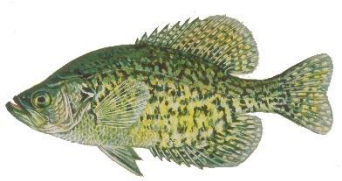
Black Crappie



Fall 2015 Fyke Nets

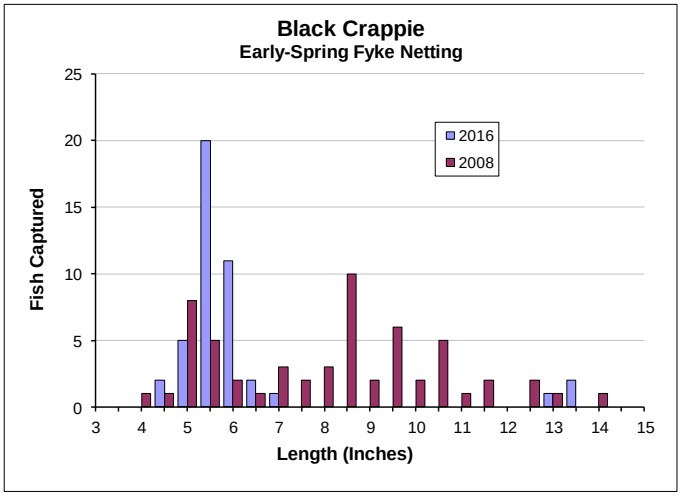
Captured 14 per net-night ≥ 5"	
Quality Size ≥ 8"	0.9%
Preferred Size ≥ 10"	0%
Memorable Size ≥ 12"	0%





Early Spring Fyke Nets

	Number per net-night ≥ 5"	Quality Size ≥ 8"	Preferred Size ≥ 10"	Memorable Size ≥ 12"
2016	3.5	7%	7%	7%
2008	7.0	63%	25%	7%



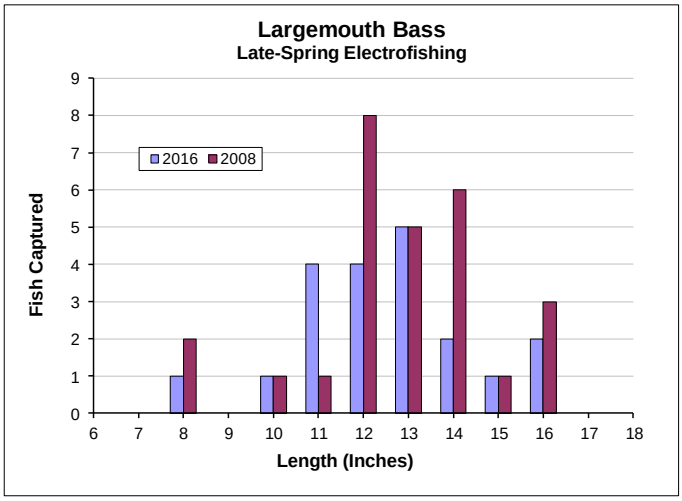
Our fall 2015 and spring 2016 netting surveys depict a black crappie population comprised of fewer year classes than in spring 2008 when we captured crappies in many size and age groups. Anglers had better fishing opportunity in 2008 when one of four crappies in our nets was at least 10 inches long. Our most recent fyke net samples both included a predominant cohort of age-4 crappies 4.5 – 6.5 inches long and very few individuals longer than 7 inches. Age analysis using otoliths (ear bones) revealed that their growth rate was well below the statewide and regional averages. Average length at age 4 was 5.6 inches (range 5.4-5.9; n=3) compared to the regional average of 8.3 inches at that age. The abundant "class of 2012" may be temporarily crowded in a bottleneck where suitable forage in short supply is limiting their growth progression. Deer Lake crappies have demonstrated their capability to reach 14 inches long. If enough age-4 crappies die, allowing some to pass through the food bottleneck, the survivors should grow near the normal rate to attain "preferred" and "memorable" sizes. Gaps in the length distribution of our recent samples show several consecutive years before 2012 when the population produced few or no replacements for the crappies that succumbed to angling and natural causes. As a result, crappie fishing will be slow for several years until the 2012 year class advances to keeper size. Our netting catch rates point toward moderate crappie abundance in 2008 and 2015-2016, and the apparent decrease in spring netting catch rates more likely reflects a difference in water temperature and associated capture vulnerability, rather than a 50% reduction in abundance. In 2008 we did not use our traditional method, fall netting, to assess black crappie population status, nor did we analyze their growth patterns in that survey.

Illustrations by Virgil Beck

Largemouth Bass

Late Spring Electrofishing

	Number per mile ≥ 8"	Number per hour ≥ 8"	Quality Size ≥ 12"	Legal Size ≥ 14"	Preferred Size ≥ 15"
2016	10	20	70%	25%	15%
2008	13	30	85%	37%	15%

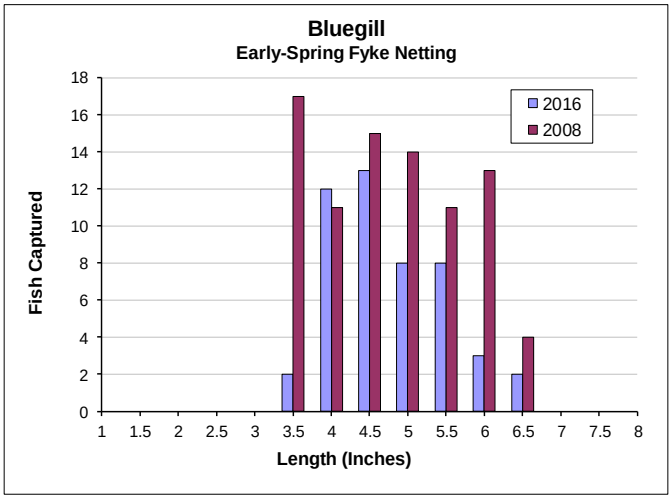


The electrofishing capture rates and the proportions of quality- and legal-size largemouth bass decreased just slightly from 2008 to 2016, suggesting that bass population status has maintained moderately low adult abundance and a size structure we rated as "fair" over an 8-year period. In both surveys the length distribution of largemouth bass included several age classes, but no fish longer than 16 inches. On April 26 and May 9, 2000 at water temperatures 59 and 63°F electrofishing capture rates were 51 and 54 bass per hour, indicating higher abundance than we found in recent surveys. The shares of legal- (29 and 20%) and preferred-size (12 and 10%) fish in the spring 2000 surveys were similar to those found in 2016, but both spring 2000 samples included larger bass up to 18 inches long. The survey history shows that largemouth bass at low to moderate levels of abundance have consistently been unable to control bluegill numbers and assure good bluegill fishing in Deer Lake.

Bluegill

Early Spring Fyke Nets

	Number per net-night ≥ 3"	Quality Size ≥ 6"
2016	4.0	10%
2008	11	20%

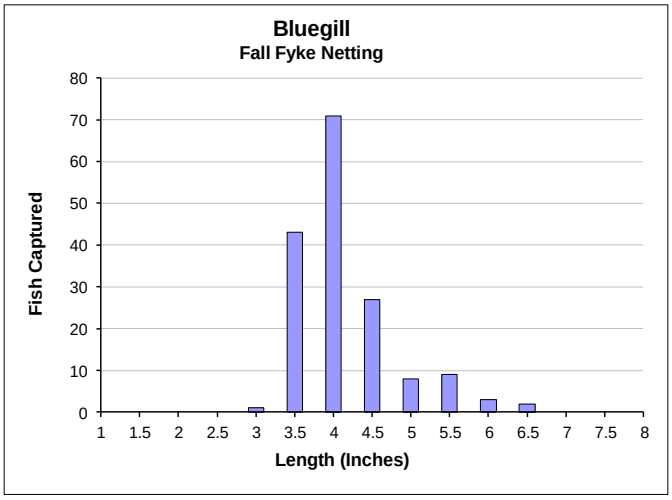


Illustrations by Virgil Beck

Bluegill

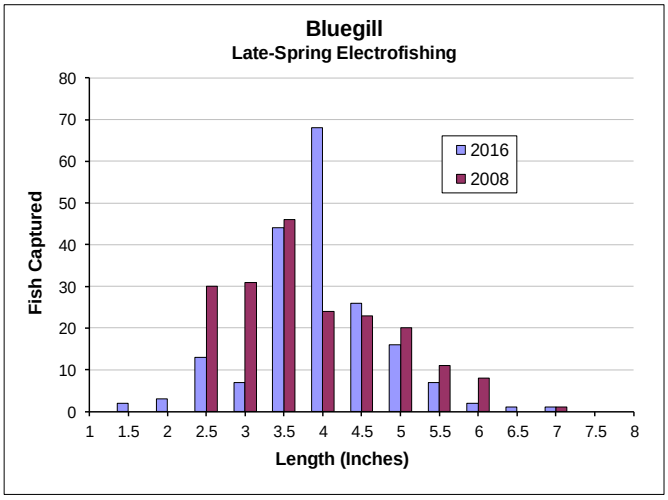
Fall 2015 Fyke Nets

Captured 21 per net-night ≥ 3"	
Quality Size ≥ 6"	3%
Keeper Size ≥ 7"	0%



Late Spring Electrofishing

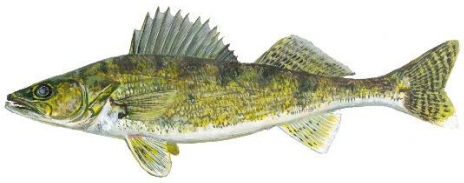
	Number per mile ≥ 3"	Number per hour ≥ 3"	Quality Size ≥ 6"	Keeper Size ≥ 7"
2016	344	637	2%	0.6%
2008	162	410	5%	0.6%



Our high electrofishing capture rates characterized a population of very small bluegills in very high abundance. Late spring electrofishing catch rates nearly doubled between 2008 and 2016, but the apparent increase in bluegill abundance did not erode their size structure much further because past surveys show that Deer Lake has always had too many bluegills to support satisfactory growth and good fishing. Electrofishing catch rates were even higher in April and May 2000 when we caught 890 and 1,007 bluegills per hour. All recent measures found very low percentages of quality-size fish. Fyke nets sometimes capture larger bluegills that go undetected in spring electrofishing samples, but spring and fall netting captured no keeper-size bluegills at least 7 inches long. With moderately low largemouth bass abundance and no effective help from other predators to control bluegill numbers, it is clear, even without age-length analysis, that crowding and food competition result in slow growth and most bluegill die of natural causes before they can reach 7 inches and longer. Unfortunately, this undesirable condition will persist indefinitely without effective predatory control.

Illustrations by Virgil Beck

Walleye



Fall 2015 fyke nets captured a single 20-inch walleye that either migrated from the Elk River population, or was introduced without authorization. We found no record of walleye stocking since 1954 when 3,375 fingerlings were planted. Before then, Deer Lake received nearly 916,000 walleye fry in six years 1933–1941. A few young and adult walleye were captured in prior surveys, but their numbers trended downward since stocking ended more than 60 years ago: seven in 1962; eight in 1970; one in 1981, 2000, and 2015, and none in 2008. In a February 20, 1986 report WDNR's Fish Manager recommended to "rule out any move toward walleye management" due to "low potential for success and a high risk factor for bass and panfish." He further warned that "the lake should not be considered for future walleye management, based on a lack of forage and habitat and the species' well-known ability to decimate largemouth bass and panfish populations." We offer an alternative management approach.

Over a 55-year survey history, Deer Lake panfish always grew slowly and rarely attained keeper size. Frankly, its bluegill and at times its black crappie populations need decimation before they can offer decent fishing. Clearly, largemouth bass are not up to the task, even with help from northern pike and stocked muskies. A walleye stocking strategy could supplement predatory pressure enough to control panfish recruitment, moderate bluegill and crappie year class production, restore near normal growth rates, increase the proportions of keeper-size fish, and improve panfish angling opportunity. Combined predation by stocked walleye and largemouth bass shows promise as a management tool to curb panfish abundance in northern Wisconsin lakes of this size. The once-dreaded side effects of walleye on largemouth bass could be controlled by carefully-prescribed walleye stocking rates and subsequent monitoring and adjustment. With gravel covering 40% of the near shore lakebed walleye may find suitable spawning habitat, and we do not know whether young walleyes produced in the lake would contribute to and eventually sustain an adult population. According to a 1971 report, stocking walleye as fry and (probably small) fingerlings "was discontinued because of [their] poor return to the fishery," so it is unlikely that walleye could maintain a population that did not rely on regular stocking.

Survey data collected and analyzed by: Evan Sniadajewski, Matt Anchor and Jeff Scheirer—WDNR Fishery Team, Park Falls.

Written by: Chad Leanna—Fishery Technician, January 2017.

Edited by: Jeff Scheirer—Fishery Biologist, February 2017.

Reviewed by: Steve Gilbert—Woodruff Field Unit Supervisor, January 25, 2018.

Approved for web posting by: Mike Vogelsang—Northern Administrative District Supervisor, January 29, 2018.

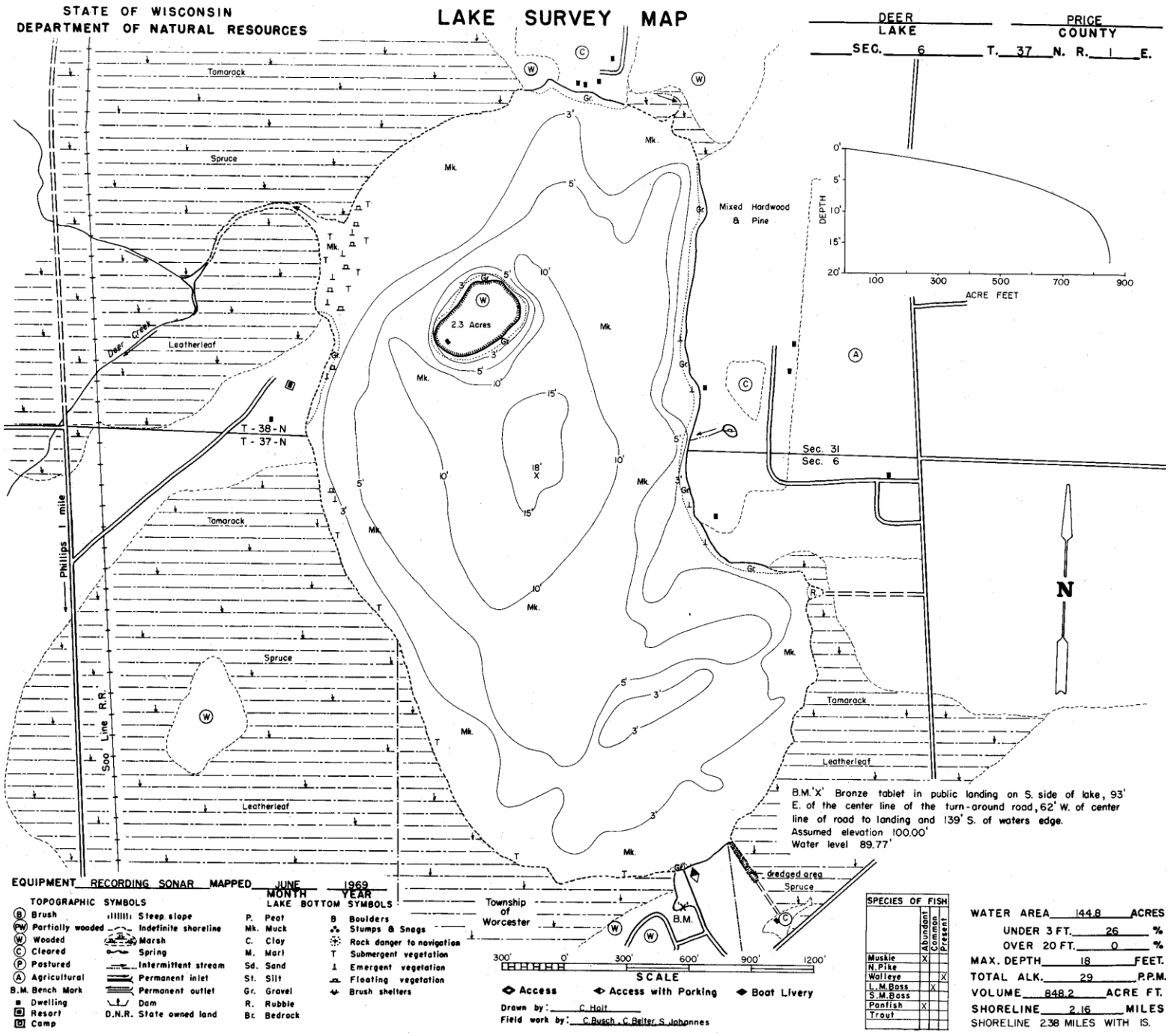
Illustrations by Virgil Beck

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

LAKE SURVEY MAP

DEER LAKE — PRICE COUNTY

SEC. 6 T. 37 N. R. 1 E.



EQUIPMENT RECORDING SONAR MAPPED JUNE 1969
MONTH YEAR

TOPOGRAPHIC SYMBOLS

- (B) Brush
- (PW) Partially wooded
- (W) Wooded
- (C) Cleared
- (P) Pastured
- (A) Agricultural
- B.M. Bench Mark
- Dwelling
- Resort
- Camp
- Steep slope
- Indefinite shoreline
- Marsh
- Spring
- Intermittent stream
- Permanent inlet
- Permanent outlet
- Dam
- D.N.R. State owned land

LAKE BOTTOM SYMBOLS

- P. Peat
- Mk. Muck
- C. Clay
- M. Marl
- Sd. Sand
- St. Silt
- Gr. Gravel
- R. Rubble
- Br. Bedrock
- B Boulders
- Stumps & Snags
- Rock danger to navigation
- T Submergent vegetation
- Emergent vegetation
- Floating vegetation
- Brush shelters

SCALE 300' 0' 300' 600' 900' 1200'

Access — Access with Parking — Boat Livery

Drawn by: C. Holt
Field work by: C. Busch, C. Belter, S. Johannes

SPECIES OF FISH	Abundant	Common	Present
Muskie	X		
N. Pike			
Walleye			X
L.M. Bass		X	
S.M. Bass			
Panfish	X		
Trout			

WATER AREA 144.8 ACRES
UNDER 3 FT. 26 %
OVER 20 FT. 0 %
MAX. DEPTH 18 FEET.
TOTAL ALK. 29 P.P.M.
VOLUME 848.2 ACRE FT.
SHORELINE 2.16 MILES
SHORELINE 2.38 MILES WITH IS.